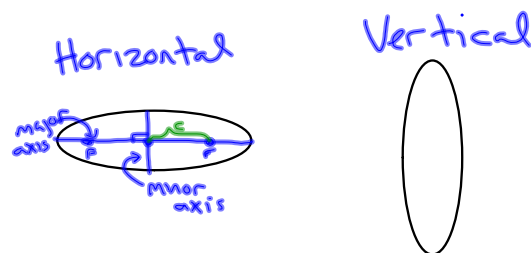
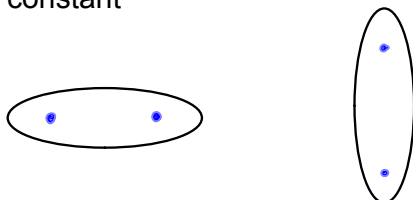


8.4 Ellipses

Ellipse--the set of all points such that the sum of the distances from a point to two fixed points (foci) is a constant

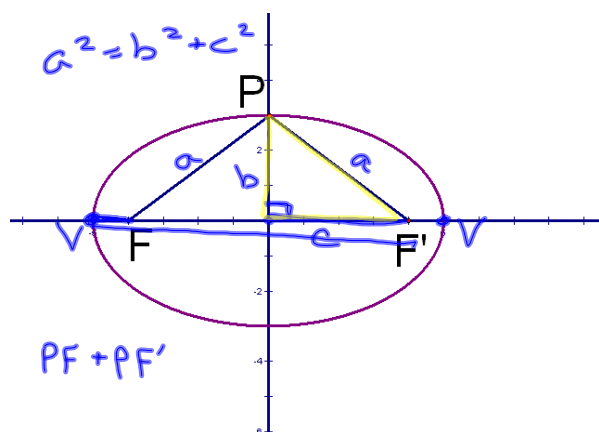


Axes are parallel to the coordinate axes

$2a$ = length of major axis

$2b$ = length of minor axis

c = distance from center to foci



Horizontal Ellipse

$$\frac{(x-h)^2}{a^2} + \frac{(y-k)^2}{b^2} = 1$$

$$a > b > 0$$

$$C(h, k)$$

$$a^2 = b^2 + c^2$$

$2a$ = sum of focal radii

Vertices-endpoints of major axis

Vertical Ellipse

$$\frac{(x-h)^2}{b^2} + \frac{(y-k)^2}{a^2} = 1$$

GSP

Reflective properties

http://www.ies.co.jp/math/java/conics/focus_ellipse/focus_ellipse.html

$$\frac{(x)^2}{9} + \frac{(y)^2}{16} = 1$$

$C(0,0)$

$$a = 4$$

$$b = 3$$

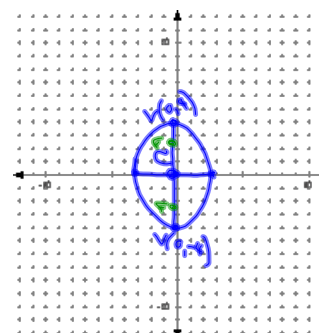
$$c = \sqrt{7}$$

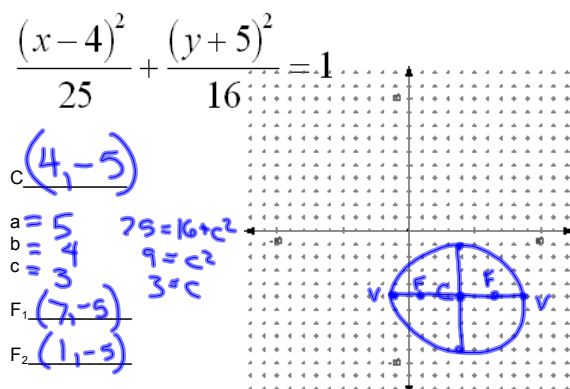
$$F_1(0, \sqrt{7})$$

$$F_2(0, -\sqrt{7})$$

$$16 = 9 + c^2$$

$$7 = c^2$$





$$9x^2 + 4y^2 - 18x + 16y - 11 = 0$$

$$9x^2 - 18x + 4y^2 + 16y = 11$$

$$9(x^2 - 2x + 1) + 4(y^2 + 4y + 4) = 11 + 9 + 16$$

(Factor out coeff. of $x^2 + y^2$)

$$9(x-1)^2 + 4(y+2)^2 = 36$$

$$\frac{(x-1)^2}{4} + \frac{(y+2)^2}{9} = 1$$

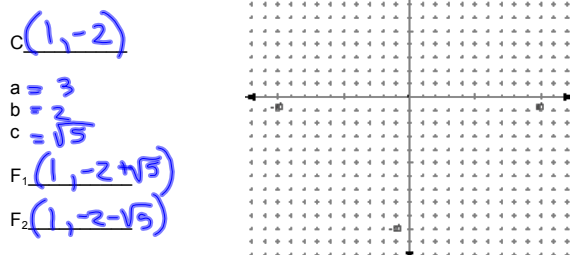
$a = 3$
 $b = 2$
 $c =$

Write the equation of an ellipse with a $C(0,0)$ and a horizontal major axis.

$$a = 6$$

$$b = 4$$

$$\frac{x^2}{36} + \frac{y^2}{16} = 1$$



Write the equation of an ellipse with x-intercepts of $\pm\sqrt{2}$ and y-intercepts of ± 3

$$C(0,0)$$

vertical

$a = 3$
 $b = \sqrt{2}$

$$\frac{x^2}{2} + \frac{y^2}{9} = 1$$



Write the equation of an ellipse with Foci, $F(-2, 0)$ and $F(2, 0)$ and $a = 7$

$$C(0,0)$$

$a = 7$
 $c = 2$
 $49 = b^2 + 4$
 $45 = b^2$

$$\frac{x^2}{49} + \frac{y^2}{45} = 1$$

HW
p438
13-21 odd, 29, 35

Attachments

ellipse.gsp

ellipse(1).gsp